



1<sup>ST</sup> INTERNATIONAL CONGRESS  
ON  
ADDITIVE MANUFACTURING  
BOOK OF ABSTRACTS

IWAM 22



SEPTEMBER 30, 2022



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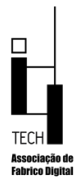
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## **The importance of STEAM education in schools: literature review**

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### **SUMMARY**

Never before has there been so much talk about educational innovation like today! Innovation that translates into a continuous process of improving teaching in our schools, which necessarily involves the human development of each and every student, focusing on areas that also accompany the technological development of recent decades.

The advent of new emerging technologies has led to the emergence of teaching and learning approaches aimed at cultivating the critical thinking needed for the complex and rapidly changing digital age. This trend has contributed to an integrated approach to teaching and learning known as STEAM (Meletiou-Mavrotheris M., 2022).

It is this methodology that we intend to briefly address in this work, given that the topic is emerging and that it should be studied empirically, so that this methodology is implemented in our schools, although the same is not done in this work, limiting itself to a more theoretical approach.

Thus, a literature review was carried out in order to clarify the extent to which STEAM education can contribute to the much-desired educational innovation.

### **INTRODUCTION**

STEAM is known as a pedagogical and educational approach that integrates areas and is based on projects, aiming to train students with different knowledge, so that they develop different knowledge skills.

This methodology emerged in the United States in the 1990s, after students showed a lack of interest in the exact sciences. The acronym STEAM results from the English words Science, Technology, Engineering, Arts, Mathematics.

Although this approach was initially called STEM, today it integrates more the letter “A” of Arts, which is associated with the four initial areas of the exact sciences.

It is understood today that arts education improves academic performance and helps our students to better interpret the world, and that is what the STEAM methodology wants to demonstrate.

In this sense, Arts should be understood as a discipline that brings to the fore themes such as humanities, language, culture, architecture, literature, music, dance, cinema, theater, sculpture, design, painting, animation and photography (Antunes, J.).

Thus, we can say that STEM is about how things are done, while STEAM encourages the discovery of why these things are being done.

### **METHODOLOGY**

The methodology adopted for this research work was done through a brief systematic review of the literature, where some scientific articles present in the Scopus database and Google were selected, according to the topic under study.

The literature review intends to provide a small theoretical contribution, since it brings together recent knowledge in the area of the STEAM approach, also serving to expand knowledge through empirical research carried out.

The process began by searching the Scopus database and Google within “article title, abstract, keywords” with the following keywords related to the theme of this work: STEM education; STEAM approach; STEAM education and STEAM pedagogy. This research had the first filter by restricting the time horizon to the last decade (2012-2022). This choice was due to the fact that this approach is quite current.

## **RESULTS**

The STEAM methodology according to (Antunes, J.) focuses on the development of some essential skills for the 21st century student, such as:

- Creativity, imagination and innovation.
- Critical thinking and problem solving.
- Communication and collaboration.
- Flexibility and adaptability.
- Social and cultural skills.
- Ability to deal with different situations.

In STEAM projects, it is intended that students begin to develop these skills in a more interactive and autonomous way. Build, prototype, create, troubleshoot and interpret your own creations.

For (Noemi, D., 2018) STEAM education is more dynamic, therefore, it favours the learning of students who are not always able to absorb or retain knowledge with the traditional teaching model seen in most schools. Pointing out the following advantages for education:

- Learning and acquisition of interdisciplinary knowledge.
- Applicability of learning.
- Changes in the relationship between teacher and student.
- More preparation for the job market.

Another author (Silvia, I.O., 2017) considers the STEAM methodology as an active methodology, that is, they are interactive processes of knowledge, analysis, studies, research and individual or collective decisions, in order to find solutions to a problem. It is the teaching process in which learning depends on the student himself. The teacher acts as a facilitator or advisor for the student to do research, reflect and decide for himself, what to do to achieve a goal.

In the same line of reasoning, (Hero's Academy) consider that the STEAM approach removes the limitations of traditional teaching and replaces them with logical and interpretive reasoning, criticism, research and innovation. STEAM does not just teach theories or concepts, but develops practical experiences and problem solving that stimulate scientific thinking in an interpretive and reflective way, generating a greater understanding of reality.

## CONCLUSION

More than understanding that the world is constantly evolving, we also need to adapt to changes and education is part of this paradigm.

From the literature review we can conclude that the STEAM approach favours learning through experimentation and creation in an interdisciplinary way.

As future work, we propose the analysis of this approach in an empirical way in schools in Portugal, differentiating the schools of Higher Education.

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